

Sir Wm. Thomson read a paper *On an Improved Method of Recording the Depth in Flying Soundings, by substituting Chromate of Silver laid on by Albumen instead of Green Vitriol Solution.*

On the Eddystone Lighthouse, by J. N. Douglas.—He stated that the rock upon which this lighthouse was built had been so undermined by the sea that it had been determined to build another of larger dimensions at a distance of 120 feet from the present structure. He expressed a hope, however, that if Smeaton's wonderful handiwork were taken down, it would be considered worthy of another site on English soil.

On Recent Experiments in Telephones, by Prof. Graham Bell, of Boston.—He stated at the outset that after the lecture delivered by Mr. Preece it would be scarcely necessary for him to put before them a description of the construction and the operation of the telephone in its present form, but he thought it would be interesting if he took up the subject in another light, and showed them the evolution of the telephone, and described to them the process by which the instrument had been brought up to its present state. Having alluded to the fact that it was now some years since his attention was first directed to the form of the vibrations of the air during the production of speech, and having pointed out that he was not aware how the idea of using electricity as a means of conveying these vibrations from one place to another suggested itself to him, Mr. Bell gave an interesting account of the time and labour which he, assisted by Dr. Clarence, J. Blake, Prof. Pearce, and other friends on the other side of the Atlantic, had devoted in endeavouring to discover some means by which the sound of the human voice could be successfully conveyed to whatever place was desired. He gradually traced the progress of these researches, and enumerated the different forms of instruments which had been invented for the purpose of accomplishing the object desired, several of which instruments he exhibited, at the same time explaining that experiments were still being made in Boston with a view to further improvements in, and in the further development of, the telephone. He confessed that he did not yet know which was the best form of instrument that could be used, reminded his audience that he did not bring the invention before them as a perfected one, that it was still in embryo, but expressed a hope that at the next meeting of the British Association he might have the opportunity of producing before them still more perfect forms of the instrument. Prof. Bell then announced that he had brought with him his telephonic organ, and that he should presently attempt to produce a little "bad" music for the benefit of the Association. This organ, he explained, resembled a harmonium or parlour organ. The reeds were all connected with a battery, and in front of each reed there was a little screw with a platinum point. When the instrument was blown the reeds vibrated against the screws, which were all connected with a telegraph wire, which had been brought into that room, and contact being made, the music was thus conveyed. He also explained that the organ was in the Guildhall, and that telegraphic communication had been made between that building and the Post-office, and between the latter place and the room in which they were then assembled. Experiments with the instrument were then proceeded with, the telegraph wire being attached by Mr. Preece to a telephone with a powerful battery and with a somewhat capacious "mouth." Harris, Mr. Preece's assistant, who was stationed at the Post-office, was then communicated with by that gentleman, and told to request the organist to "strike up," and almost immediately the audience were astounded by hearing with perfect distinctness the well-known air, "God save the Queen." The organist was then ordered, through Harris, to play "something with chords," and again the sounds of music were clearly heard, although this time the tune could not be recognised. Another instrument without a battery, was then connected with the wire, but as Mr. Bell had prophesied, the sounds of music conveyed to the audience by means of this instrument were very faint, being audible only to those at the top of the room. The first instrument was now again used, Harris being requested by the professor to sing as loudly as possible. In a second or two the favourite song "Auld Lang Syne" was heard with remarkable clearness, although many of the notes were somewhat "shaky." Harris next read a newspaper paragraph, and although the sound of his voice was distinctly heard, no one was able to ascertain the subject of what he was reading. Prof. Bell explained the reason of this, and informed the audience that the louder the voice was at the transmitting end the more indistinctly it was heard at the other end.

THE FRENCH ASSOCIATION AT HAVRE

THE French Association commenced its Session this year at Havre on August 23. M. Broca, the well-known anthropologist, is president this year, and after a few remarks on the rapid and steady progress of the Association, he announced as the subject of his presidential address, "The Fossil Human Races of Western Europe."

M. Broca spoke of the antiquity of historical nations, showing that it has been very much exaggerated, mainly by the nations themselves, and that even in the case of Egypt the historical epoch cannot be pushed back beyond 6,000 or 7,000 years. M. Broca then showed that up to a very late period man's advent on the earth was universally accepted as very recent, long posterior to the last geological phenomena which have modified the conditions of life and produced changes in climate, and with these in the flora and fauna. The president then gave a brief sketch of the change of opinion which has taken place during the past thirty or forty years, on the question of the antiquity of man; pointed out with what incredulity the accounts of the first finds of human remains under conditions showing their antiquity were received, and that it was only after long years of labour, 1840 to 1858, that Boucher de Perthes at last managed to obtain a serious hearing for the argument in favour of the genuineness of his discoveries and of the antiquity of man. The English palæontologist, Falconer, went to Abbeville, in 1858, in order to examine at once the beds explored by Perthes, and the rich collection of cut-flints and bones which had been exhumed. M. Broca refers also to the early work in the same direction of Prestwich, Evans, Flower, and Lyell, stimulated by whose example, French men of science at last came forward in earnest to examine for themselves. The French Anthropological Society took the matter up, and the prudent and straightforward Isidore Geoffroy St. Hilaire at last declared that the last objections to the antiquity of man had vanished. Fossil man had proved his right to be received on the platform of positive science. The year 1859, which saw the doctrine of the antiquity of man make its way into science with irresistible force, was the beginning of one of the most fruitful of eras. New and boundless horizons were opened to the view of men of science; over all Europe geologists, archaeologists, anthropologists, set themselves to work with astonishing activity. Only eighteen years have passed since then, and never, perhaps, in any past time, have we seen so rich a harvest.

Boucher de Perthes raised only a corner of the veil which conceals early humanity. He proved that man lived during all the quaternary epoch, that he was the contemporary of the reindeer and other animals which have since migrated, of the mammoth, and other extinct animals. But was this all? and is humanity not older still? This latter question, still more grave than the former, was soon asked; more grave, for the duration of each of the three periods of the tertiary epoch was incomparably longer than the quaternary epoch. But M. Broca did not intend to discuss the researches concerning tertiary man; the discoveries made by M. Desnoyers at St. Prest, near Chartres, and by Prof. Capellini in several tertiary beds of Tuscany, tend to establish the existence of man during the pliocene period; those of the Abbé Bourgeois in the commune of Thenay (Loiret-Cher) carry back even to the miocene, *i.e.*, to the middle-tertiary, the existence of an intelligent being who knew how to cut flint, and who could be nothing else than man. But these facts, although collected by thoroughly competent observers, and although accepted after keen discussion by many eminent *savants*, are not yet sufficiently numerous nor incontestable to constitute a definitive proof. Tertiary man is not yet on the platform of science; he holds the place occupied by quaternary man twenty years ago. Will it be given to another Boucher de Perthes to demonstrate with irresistible evidence the existence of tertiary man? That is the secret of the future.

After referring to the vast amount of evidence for quaternary man obtained both in the Old and New World, M. Broca said that he is better known now than many peoples mentioned in history. We know enough to establish with certainty the multiplicity and the great diversity of quaternary races, and although the regions hitherto explored include only Western and a part of Central Europe, we can now, on this little corner of the globe, recognise and distinguish at least three fossil human races connected with two essentially different types. The two types are the dolichocephalic and the brachycephalic—the long-heads and the short or round-heads. Between these are the mesatocephalic.

By dividing the one diameter of the head by the other we obtain what is known as the cephalic index. The dolichocephalic are those whose cephalic index is less than $\frac{3}{4}$ or 77.7 to 100; the brachycephalic are those whose index is greater than the fraction $\frac{3}{4}$ or 80 to 100; the index of the mesocephalic is between the two. But the variations of the cephalic index are so extended that it appears useful to distinguish two degrees in the dolichocephalic type; the dolichocephalic properly so called are those whose index descends below 75 to 100, the index of the sub-dolichocephalic being above that limit. So among the brachycephalic, we distinguish these properly so called from the sub-brachycephalic, according as the index is above or below the fraction $\frac{3}{4}$ or 83.3 to 100. In consequence of many mixtures of races which have been produced before or during the historic period, these diverse cranial forms exist to-day with a varying degree of frequency among all the populations of Europe. We may conclude with certainty that the peoples of Europe are the issue of several races characterised by very different cranial forms.

After referring to the simple theory of Retzius, M. Broca said that the diversity of the races of Europe does not date from the almost recent era of the Asiatic invasions; it does not date from that long period of polished stone which preceded the introduction of metals, and which succeeded the age of the reindeer; it goes back to quaternary times. More, the dolichocephalic type, far from being the latest comer among us, is the most ancient of all; the migrations and the mixture of races, far from developing it, have only attenuated it; and these brachycephalics, who were formerly considered an autochthonous race, conquered and dispossessed by stronger and more civilised races, have been, on the contrary, foreign invaders, whose slow and progressive immigration modified in a manner as profound as durable the ethnology of Western Europe. They only appeared in the later times of the quaternary epoch. Before them two other races of dolichocephalic type had successively occupied the ground. M. Broca then proceeded to describe the chief distinctive characteristics of these three races, discovered by science after so many ages of oblivion. Names have been given to these three races after the places where their remains have been found, viz., Canstadt, Cromagnon, and Furfooz.

The race of Canstadt is the oldest. Its remains were exhumed so long ago as 1700 by Duke Eberhard, of Würtemberg, at Canstadt, near Stuttgart. These remains were found in the Würtemberg collections only in 1835 by Fred. Joeger, who recognised their importance. But the Canstadt cranium has not been universally accepted as genuine. Six or seven other incomplete crania, some fragments of jaws and long bones, are all that have hitherto been found of the Canstadt race. To these belong the Neanderthal skull and the lower jaw, found by M. Dupont in 1865 in the Naulette Cavern, in the valley of the Lesse, Belgium. The jaw has some very peculiar characteristics, and the Neanderthal skull recalls the form of that of the anthropoid apes. The Canstadt race seems to have been robust, of short stature, probably not exceeding from 1.68 m. to 1.70 m. The crania, though incomplete, show that the Canstadt race was "dolichoplatycephalic," i.e., long-headed, but with the top of the head much flattened. The marked dolichocephaly of the Canstadt race is to be found now only among the Australian and the Esquimaux. The platycephaly was due greatly to the obliquity of the forehead, which rapidly retreated. Although the occipital region was also prominent, yet the cranial capacity was small, and appears to have been smaller than that of the Hottentots and Australians. Other characteristics of inferiority were the prominence of the incisors, the great size of the jaws, the total absence of chin, and the total absence of the alveolar arch. If the skull found in the Forbes Quarry at Gibraltar be of the Canstadt type, as M. Broca is inclined to think, it shows still more marked characteristics of inferiority. The Canstadt race, he concludes, was certainly very savage, more savage than any existing race; its instruments were of the rudest kind, and it had to carry on a painful struggle for existence with the powerful mammals that then disputed the ground with them. Nevertheless its geographical extension was very great; it is found at Brux, in Bohemia; at Canstadt, in Würtemberg; at Neanderthal, in the Rhine provinces; Naulette, in Belgium; Eguisheim, in Alsace, at Paris, Arcy-sur-Cure, in Yonne, Mount Denise, in Haute-Loire, Olmo near Arezzo, Tuscany, and probably at Gibraltar. In Central and Western Europe then it maintained its place from the beginning to the middle of the quaternary epoch, when appeared another stronger and more perfect race which took the place of the former only probably after having nearly exterminated it.

This second fossil race was that of Cromagnon. It takes its name from a cave discovered in 1868, near the village of Eyzieux, in the valley of the Vézère, Dordogne. This race, now represented by a score of crania, some almost complete skeletons, and a large number of bones, is comparatively well known. Though dolichocephalic like the Canstadt race, it otherwise differs completely from it. Its mean height was 1.78 m., and one skeleton measures 1.85. Its crania was equal if not superior to that of modern Parisians; forehead straight and high; vertical diameter well developed, and the cranial arch elevated; chin pronounced, and lower incisors vertical. The type as a whole approaches the Caucasian, though the upper incisors project somewhat, and the cheek-bones are high. The Cromagnon race is also characterised by its peculiar bones, its elastic-like femur, its platycnemic tibia, its channelled fibula, its arched cubitus; these characteristics, found now only in scattered individuals and much subdued, are normal to the Cromagnon race, and distinguish it from all modern races. With regard to the great capacity of the Cromagnon skull it should be remembered that among them the weak in intellect as in body would not survive as they do with us; still it shows a highly intellectual race, as is evidenced besides by the highly finished remains of their work which have been found. This race did not extend so far east as that of Canstadt. It has been found in Italy and probably in Britain; but it occupied especially France and Belgium. Its chronology coincides almost with the second half of the quaternary epoch, the age of the reindeer being that of its greatest prosperity. Its decline came with the departure of that animal. Still the race survived in some parts, and mixed with new races, and they have left behind them a lasting anthropological characteristic; even now their peculiarities occasionally appear in obedience to the law of atavism.

The Cromagnon race takes us down to the neolithic period; the Furfooz race leads us back to the reindeer. The latter race was discovered in 1866 and 1867, by M. Dupont, in several caverns on the right bank of the Lesse, near the village of Furfooz, Belgium. Crania, bones, and cave-dwellings have furnished materials for its study. The height of the Furfooz race was only 1.53 m. to 1.62 m., and descends even to the level of the Lapps. The bones are exactly similar to our own. Its only peculiarity was the elbow-perforation of the humerus, which, however, cannot be regarded as any mark of inferiority. With this race appears for the first time a rounded cranial type, which is not yet true brachycephaly, but which announces the arrival of the brachycephalics. The cranium as a whole is small, especially in its anterior parts; the forehead is narrow, low, and retreating, the vault little elevated, thus placing the race below that of Cromagnon, and nearer that of Canstadt. The face is smaller than the Cromagnon one, cheek-bones less prominent, the orbits narrower and higher, the nasal opening less extended compared to its breadth, the lower jaws smaller and thinner. The Furfooz race arrived in Belgium only at the end of the reindeer age. They lived in caverns and by the chase, but were inferior to the Cromagnons, their art and their weapons and implements being of a much ruder type. But they manufactured pottery, which is not found among the remains of the Cromagnon race, and which would indicate a date a little before the epoch of polished stone. This race was mesocephalic or subdolichocephalic, and while they lived in Belgium, the true brachycephalics, with indices of eighty-three, eighty-five, and beyond, entered France by the eastern frontier. Their remains have been found at Solutré, in the Mâconnais. The discovery made in the loess at Nagy-Safi, near Gran, in Hungary, proves that the true brachycephalics lived on the Danube at the height of the quaternary epoch. Their immigration, however, belongs to subsequent geological periods belonging to the present geological epoch, and therefore not entering into M. Broca's subject; they may possibly have been modifications of the Furfooz race, by crossing and otherwise.

It is the problem of anthropologists to unravel these different elements as they appear in modern European races; and altogether we have no reason to be ashamed of our remote ancestors.

The Mayor of Havre followed M. Broca with a few warm words of welcome, when M. Deherain, the general secretary, gave a sketch of the work of the Association in 1876. M. G. Masson, the treasurer, made a statement as to the funds of the Association. For the past year its income has been 48,764 francs, and its expenditure 44,181 francs, of which 6,361 francs were given as grants for research. The capital of the Association at the end of 1876 was 210,307 francs.

The bad weather, our correspondent writes, has told upon the

success of the various excursions organised. The uncertainty of public affairs, moreover, has caused the French papers to give the most meagre reports of the proceedings; indeed only the titles of a number of communications are given without any attempt at a report.

On Friday M. Fremy was elected president for 1878 by a full house, and almost unanimously. The place of the next meeting will be Paris in all probability. Consequently an opportunity will be afforded to influential members of the French Institute to give a new impulse to the organisation of the French Association, and to remodel it more fully according to the pattern of its English sister.

A number of members of the British Association arrived at Havre at the beginning of the session, including Dr. Huggins, Prof. Sylvester, Messrs. Glaisher, sen. and jun. It has been regretted that no formal delegation from France was sent to Plymouth, as contemplated, and that no direct request was sent to Mr. Bell to bring over his wonderful telephone.

A committee was appointed at Clermont-Ferrand to report on the position of French meteorology. A report was drawn up pointing out the necessity of memorialising the French Government to establish a special meteorological institute. The report was not adopted by the Meteorological Section, and a new report will be drawn up, and was to be proposed on Monday. But the discussion will offer little interest, owing to the absence of the leading French meteorologists.

The mathematical and astronomical section has been well attended under the presidency of Professors Catalan (Liège University) and Sylvester, the former being acting president and the second honorary.

The Geological Society of Normandy has organised an exhibition of local geology in the old Palais de Justice, which may be considered as a model of care, order, and completeness. A number of large oil pictures have been executed to show the different stages of the evolution of life before the appearance of man on earth, from the age of coal-measures.

M. Gabriel de Mortillet, general secretary to the section of anthropology of the International Exhibition, has delivered a lecture on the organisation of that section. The Trocadero Palace will be devoted entirely to "Histoire de l'Homme." One of the aisles will be devoted to the ethnography of living savage nations, and will be considered as affording a fair representation of primordial ages. The other aisle will be entirely devoted to the history of the arts, which are supposed to represent civilisation in its highest state of development. The central part of the building is devoted to anthropological science, viz., European anthropology, prehistoric anthropology, demography, comparative linguistic, &c. Exhibitors of all nations will be admitted, and all the expenses of the exhibition will be supported by the French administration. The space allotted to foreigners for this exceptional exhibition will not be reckoned as part of the total space granted to their own nation in the Champ de Mars. M. Gabriel de Mortillet, Chateau de Saint Germain, Seine-et-Oise, will answer any letters addressed to him, and give practical directions to intending exhibitors.

The scheme, of which we gave details some time since, has been conceived by M. Krantz himself, who was desirous to see the science of man utilised as an introduction to the exhibition of the works of man.

ENGLISH NAMES OF WILD FLOWERS AND PLANTS¹

EIGHT years ago I was piloting a famous botanist from the east of England among the fields and lanes round Taunton, when he asked me the name of a plant which he did not at the moment recognise. I answered that it was the gipsy-wort, and received a prompt rebuke. "This is the third time," he said, "that I have inquired the name of a flower, and you have answered me in English. The Latin names are universal, the English at best are local. It is to be wished that all English names of plants could be forgotten, and their scientific names become popularised instead." Unquestionably a foolish utterance, it was of great service to myself, for it set me to consider the real value of these names which my pedantic guest despised, and from that time to this I have never encountered the popular name of any English wild flower without questioning it closely as to its etymological history and meaning, and noting the

passages in our literature where it occurs. It would be a great pleasure to me to believe that the knowledge gained by these inquiries, put together to the best of my power, could interest you to-night as much as it has interested myself.

It is no new thing to infer from the terms in use at the beginning of a nation's history the arts and customs of the nation using them. Thus the fact that in all or nearly all the Aryan languages the words for the Supreme Being, for the king, for brother and sister, for ploughing, grinding, building, closely resemble one another, is admitted to show that our common forefathers in times when they were still one people, and had not yet scattered into India, Persia, Europe, had the beginnings of religion and government, possessed the family life, knew the simple arts which are most needed for the comfort of home life. Let us see what light will be thrown upon the habits of our Teutonic forefathers if we apply their method of investigation to the popular names of plants.

The following words are common to all the Teutonic languages; must have been known, that is, to the race from which we ourselves, with the Germans, Danes, Swedes, and Norwegians, are descended, on their first settlement in Europe, and before they broke up into sub-divided nations. The first I will take is *birch*, the kind of which must, we find, have been used for boat-building and for roofing houses; for boat-building, since the word *bark*, from the same root as *birch*, stands for ship in English, Dutch, Icelandic, Danish; for roofing houses, since the Old English *beorgan* and the German *bergen*, also from the same root, mean to cover, protect, or shelter. From this simple word, then, we gather that our ancestors possessed the arts of building boats and of roofing or thatching houses. Houses could not be built without timber; and we find the word *tree* in almost every Aryan language standing for three things—for a tree, for timber, and for an oak, extending the use of oak wood for building purposes back to the first formation in Asia of our mother language, and presenting us with the additional facts that our European ancestors built of oak timber the houses which they roofed with birch. In *hazel* a fresh fact lies buried. It is in all Germanic dialects the instrumental form of *has*, command or *behest*, a hazel stick having been used, as Jacob Grimm informs us, in the earliest times as a sceptre or baton to keep order among slaves and cattle. Without dwelling on the fact that the old word *helsian*, to foretell, indicates the use of the hazel rod for purposes of divination, we have the additional probability revealed in a single word that our remote ancestors possessed slaves and cattle. In *hawthorn*, common to Swedish, German, and English, we have testimony to the use of a haw, *hæg*, *hedge*, or fence, "honouring the holy bounds of property," and consequently to the division and appropriation of land, in the earliest Teutonic time. My next word makes some demand upon your etymological credulity. Without tracing particulars, I will ask you to believe that the Sanskrit *Kshi*, to dwell, passes through various forms in one direction to the English *home*, in another to the word *heath*; now meaning the plant which grows wild on open land, standing originally for the land itself. "My foot," says Rob Roy, "is on my native heath;" and the same idea was enshrined in the same word to the first Teuton settlers. In the forest he fought his enemies, hunted his prey, hewed timber for his fences, and peeled bark for his roofs; his home was in the open land, or *heath*, from which, again, when ages had passed away and Christianity possessed the towns, he still worshipped his father's gods upon his father's heath, and gained, as Trench thinks, his ancient name of *heathen*. A sixth word lifts him higher than all the rest. The word *beech*, in Gothic, Old-High-German, modern German, Norse, Danish, Dutch, English, is identical with *bock*, the Runic tablets of our ancestors having been carved upon this wood. In *sloe*, the wild plum, we have the root of *slay*, its tough wood having been used for bludgeons; *dog-wood* is *dagger-wood*, from *dag*, to strike; from *ash*, whose wood was therefore used for spear-shafts, came the Old English *asc*, a spear; *sedge* is allied to *sæg*, a sharp small iron sword. And let us observe that while all these plants, bearing purely Teutonic names, extend far into Northern Asia, trees which stop short at a more southern limit—the elm, chestnut, holly, sycamore, plum, pear, peach, cherry—all have Latin names, showing that the Teuton squatters came from a colder country than that in which they are supposed to have settled near the Roman Provincials on the Lower Rhine. The knowledge that wheat, barley, oats, corn, rye, are all Teutonic words, completes the historical picture given by the first list of names. They show us a race of men coming from a northern to a southern region,

¹ Lecture by Rev. W. Tuckwell before the Somersetshire Archaeological and Natural History Society.